REMARKS

The claims are 16 to 30.

New claims 16 to 30 replace previous claims 1 to 15, respectively.

New main claim 16 recites the use of specific dissolution inhibitors, to more clearly point out the invention.

The significance of this feature is discussed, for example, at page 8, paragraph [0024].

Claims 1-4 and 6-15 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Gronbeck et al (U.S. 6,803,171).

This rejection is respectfully traversed.

Gronbeck et al. teach in Example 30 a polymer composition, for use in a bilayer photoresist composition, containing a terpolymer consisting of phenylsilsesquioxane units, hydroxybenzylsilsesquioxane units and *tert*-butoxycarbonato benzylsilsesquioxane units. This terpolymer is somewhat related to the ternary silicone copolymer used in the present invention to the extent that the copolymer contains three types of repeating units including the phenylsilsesquioxane units, hydroxyphenylalkyl silsesquioxane units and substituted phenylalkyl silsesquioxane units.

It should be noted, however, that a clear and unobvious difference is found therebetween in respect of the fact that, in the prior art, the substituent groups in the substituted hydroxyphenylalkyl silsesquioxane units are solubility-reducing groups eliminated by an acid such as the *tert*-butoxycarbonyl groups, rendering the copolymer insoluble or little soluble in alkali, in the latter, while, in the present invention, the alkali-solubility of the copolymer is unchanged by substituents such as alkyl.

Thus, in the present invention, the ternary silicone copolymer is never rendered insoluble or little soluble in alkali by modification but rather is retained as alkali-soluble. In this regard, the copolymer is used with addition of a further component (C), namely, a dissolution inhibitor, which is a compound having a solubility-reducing effect by dissociation with an acid to impart the composition with superior performance as a chemical-amplification positive-working resist composition.

Since it is unclear as to whether this technique would be successful, Gronbeck can never be suggestive of this technique.

Furthermore, it is essential in order to introduce the solubility-reducing groups into the alkali-soluble silicone copolymer (such as that of the present invention), i.e. those groups dissociable with an acid, to prepare a copolymer insoluble or little soluble in alkali (such as Gronbeck's), that appropriate reaction conditions be established. However, it is much easier to prepare copolymer insoluble or little soluble by the addition of a dissolution inhibitor as presently claimed.

Thus, the present claims are clearly unobvious over Gronbeck.

Claim 5 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Gronbeck et al (U.S. 6,803,171) in view of Thackeray et al. (U.S. 5,827,634).

This rejection is also respectfully traversed.

Thackeray et al. teach that with respect to the polyvinylphenyl, instead of substituting a part of the hydroxyl groups with acid-dissociable blocking groups, using a dissolution inhibitor having acid-dissociable blocking groups in combination with a resin having inactive blocking groups.

Next, as is taught by Gronbeck et al. at col. 3, lines 5-10, the silsesquioxane polymers heretofore known have a dissolution rate too high to be used in a bilayer resist system thereby causing a decrease in the lithographic performance. On the other hand, when the dissolution rate is controlled by increasing the proportion of the blocking groups, a decrease is caused in the photoreaction velocity along with a decrease in the etching resistance.

Accordingly, it is essential in the silsesquioxane polymer used in the bilayer resist system, that the composition thereof be selected with full consideration of the above facts.

The present invention is based on a newly developed ladder-type silicone copolymer consisting of (a_1) (hydroxyphenylalkyl)silsesquioxane units, (a_2) (alkoxyphenylalkyl)silsesquioxane units and (a_3) alkyl- or phenylsilsesquioxane units as the alkali-soluble resin capable of giving a fine pattern, without causing the above-mentioned disadvantages and still having a high resolution, high aspect ratio, good cross sectional pattern profile and small line edge roughness, by the combined use thereof with a dissolution inhibitor.

It is by far beyond any motivation from the combination of Gronbeck et al. and Thackeray et al., to formulate a chemical-amplification positive-working resist composition by using such a newly developed ladder-type silicone copolymer in combination with a dissolution inhibitor.

Accordingly, the rejection on Gronbeck et al. in view of Thackeray et al. is untenable and should be withdrawn.

No further issues remaining, allowance of this application is respectfully requested.

If the Examiner has any comments or proposals for expediting prosecution, please contact undersigned at the telephone number below.

Respectfully submitted,

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